

**WHAT IS CLAIMED IS:**

1. A method for producing a synthetic polymer gel comprising formulating an aqueous solution comprising at least one persulfate and at least one water-soluble vinyl monomer having an acryloyl structure, and  
irradiating said aqueous solution with UV light.
2. The method according to Claim 1, wherein the water-soluble vinyl monomer has a structure expressed by formula (I):
$$\text{CH}_2=\text{CHCO-R} \quad (\text{I})$$
wherein  
R is an entity chosen from OH, R<sub>1</sub>, OR<sub>1</sub>, NH<sub>2</sub>, NH-R<sub>1</sub> and N-R<sub>1</sub>R<sub>2</sub>,  
wherein R<sub>1</sub> and R<sub>2</sub>, which may be identical or different, may be chosen from straight, branched, and cyclic alkyl and alkoxy groups comprising from 1 to about 10 carbon atoms, which may optionally comprise at least one hetero atom chosen from O, S and N in the chain, and may optionally be substituted with at least one entity chosen from halogen atoms, hydroxyl groups, carboxyl groups, formyl groups and amino groups.
3. The method according to claim 2, wherein the straight, branched, and cyclic alkyl and alkoxy groups comprise from 1 to about 8 carbon atoms.
4. The method according to claim 3, wherein the straight, branched, and cyclic alkyl and alkoxy groups comprise from 1 to about 6 carbon atoms.
5. The method according to claim 4, wherein the straight, branched, and cyclic alkyl and alkoxy groups comprise from 1 to about 4 carbon atoms.
6. The method according to Claim 1, wherein the at least one persulfate is chosen from ammonium persulfate, potassium persulfate, and sodium persulfate.

7. The method according to Claim 1, wherein the concentration of the water-soluble vinyl monomer in solution ranges from about 300 to about 1200 mM.

8. The method according to Claim 1, wherein the at least one persulfate is present in an amount ranging from about 0.01 to about 1.0 % by weight, relative to the total weight of the solution.

9. The method according to Claim 1, wherein the wavelength of the UV light ranges from about 200 to about 290 nm.

10. The method according to Claim 1, wherein the irradiation time ranges from about 1 to about 60 minutes.

11. A synthetic polymer gel produced by irradiating a formulated aqueous solution with UV light,

wherein said formulated aqueous solution comprises at least one persulfate and at least one type of water-soluble vinyl monomer having an acryloyl structure.

12. The synthetic polymer gel according to Claim 11, wherein the water-soluble vinyl monomer has a structure expressed by formula (I):



wherein

R is an entity chosen from OH, R<sub>1</sub>, OR<sub>1</sub>, NH<sub>2</sub>, NH-R<sub>1</sub> and N-R<sub>1</sub>R<sub>2</sub>,

wherein R<sub>1</sub> and R<sub>2</sub>, which may be identical or different, may be chosen from straight, branched, and cyclic alkyl and alkoxy groups comprising from 1-10 carbon atoms, which may optionally comprise at least one hetero atom chosen from O, S and N in the chain, and may optionally be substituted with at least one entity chosen from halogen atoms, hydroxyl groups, carboxyl groups, formyl groups and amino groups.

13. The method according to claim 12, wherein the straight, branched, and cyclic alkyl and alkoxy groups comprise from 1 to about 8 carbon atoms.

14. The method according to claim 13, wherein the straight, branched, and cyclic alkyl and alkoxy groups comprise from 1 to about 6 carbon atoms.

15. The method according to claim 14, wherein the straight, branched, and cyclic alkyl and alkoxy groups comprise from 1 to about 4 carbon atoms.

16. The synthetic polymer gel according to Claim 11, wherein the at least one persulfate is chosen from ammonium persulfate, potassium persulfate, and sodium persulfate.

17. The synthetic polymer gel according to Claim 11, wherein the concentration of the water-soluble vinyl monomer in solution ranges from about 300 to about 1200 mM.

18. The synthetic polymer gel according to Claim 11, wherein the at least one persulfate is present in an amount ranging from about 0.01 to about 1.0 % by weight, relative to the total weight of the solution.

19. The synthetic polymer gel according to Claim 11, wherein the wavelength of the UV light ranges from about 200 to about 290 nm.

20. The synthetic polymer gel according to Claim 11, wherein the irradiation time ranges from about 1 to about 60 minutes.

21. A method for producing a dispersion of synthetic polymer gel particles comprising:

formulating an aqueous solution comprising at least one persulfate and at least one type of water-soluble vinyl monomer having an acryloyl structure,

dispersing said aqueous solution in a water-immiscible medium to form a suspension or water-in-oil type emulsion, and

irradiating said suspension or water-in-oil emulsion with UV light.

22. A dispersion of synthetic polymer gel particles produced by formulating an aqueous solution comprising at least one persulfate and at least one type of water-soluble vinyl monomer having an acryloyl structure, dispersing said aqueous solution in a water-immiscible medium to form a suspension or water-in-oil type emulsion, and

irradiating said suspension or water-in-oil emulsion with UV light.

23. The method according to Claim 21, further comprising separating generated synthetic polymer gel particles from said dispersion.

24. A synthetic polymer gel particle produced by the method of Claim 23.

25. The method according to Claim 1, wherein said formulated aqueous solution further comprises at least one additive chosen from pigments, fillers and nacre particles, such that after irradiation of the solution, the synthetic polymer gel particles comprise a core comprising the at least one additive.

26. The method according to Claim 21, wherein said formulated aqueous solution further comprises at least one additive chosen from pigments, fillers, and nacre particles, such that after irradiation of the dispersion, the synthetic polymer gel particles comprise a core comprising the at least one additive.

27. The method according to Claim 26, further comprising separating the generated synthetic polymer gel particles comprising a core comprising the at least one additive from said medium.

28. A synthetic polymer gel particle comprising a core comprising at least one additive chosen from pigments, fillers, and nacles, wherein said synthetic polymer gel particle is produced by the method of claim 27.

29. A cosmetic composition comprising a synthetic polymer gel, wherein said synthetic polymer gel is produced by

formulating an aqueous solution comprising at least one persulfate and at least one type of water-soluble vinyl monomer having an acryloyl structure, and

irradiating said aqueous solution with UV light.

30. A cosmetic composition comprising a dispersion of synthetic polymer gel, wherein said dispersion of synthetic polymer gel is produced by:

formulating an aqueous solution comprising at least one persulfate and at least one type of water-soluble vinyl monomer having an acryloyl structure,

dispersing said aqueous solution in a water-immiscible medium to form a suspension or water-in-oil type emulsion, and

irradiating said suspension or water-in-oil emulsion with UV light.

31. A cosmetic composition comprising a synthetic gel particle comprising a core comprising at least one additive chosen from pigments, fillers, and nacles, wherein said synthetic gel particle is produced by:

formulating an aqueous solution comprising at least one persulfate and at least one type of water-soluble vinyl monomer having an acryloyl structure, and at least one additive chosen from pigments, fillers, and nacles,

dispersing said aqueous solution in a water-immiscible medium to form a suspension or water-in-oil type emulsion,

irradiating said suspension or water-in-oil emulsion with UV light, and

separating the generated synthetic polymer gel particles comprising a core comprising the at least one additive from said medium.